WHAT IS CLAIMED IS:

1. A method for heating a catalyst bed for start-up, comprising:

providing a catalyst bed having an upstream face and a downstream face;

providing an electrical heating element positioned along one face of the catalyst bed;

passing a small flow of reactants through the electrical heating element and catalyst bed; and

heating the electrical heating element to initiate an exothermic reaction at the face of the catalyst bed, wherein the heat of reaction propagates throughout the catalyst bed thereby heating the catalyst bed for start-up.

2. The method of claim 1, wherein the electrical heating element is positioned along the upstream face of the catalyst bed.

3. The method of claim 1, wherein the electrical heating element is formed in a spiral design along one face of the catalyst bed.

4. The method of claim 1, wherein the catalyst bed is selected from the group consisting of pellets, extrudates, spheres, monoliths, and any combinations thereof.

5. The method of claim 1, wherein the catalyst bed contains catalyst selected from the group consisting of autothermal reforming catalysts, partial oxidation catalysts, steam reforming catalysts, water gas shift catalysts, preferential oxidation catalysts, anode tailgas oxidation catalysts, and sulfur absorbents.

6. A reactor module for use in a compact fuel processor, comprising:

a catalyst bed having an upstream face and a downstream face; and

an electrical heating element positioned along the upstream face of the catalyst bed, the heating element capable of initiating an exothermic reaction at the upstream face of the catalyst bed in the presence of a small flow of reactants.

7. The reactor module of claim 6, wherein the electrical heating element is formed in a spiral design.

8. The reactor module of claim 6, wherein the catalyst bed is selected from the group consisting of pellets, extrudates, spheres, monoliths, and any combinations thereof.

9. The reactor module of claim 6, wherein the catalyst bed contains catalyst selected from the group consisting of autothermal reforming catalysts, partial oxidation catalysts, steam reforming catalysts, water gas shift catalysts, preferential oxidation catalysts, anode tailgas oxidation catalysts, and sulfur absorbents.

10. A reactor module for use in a compact fuel processor, comprising:

a catalyst bed;

a cooling coil positioned substantially within the catalyst bed for removing excess heat during normal operation; and

an electrical heating element positioned within the cooling coil, the heating element capable of heating the catalyst to a desired reaction temperature.

11. The reactor module of claim 10, wherein the catalyst bed is selected from the group consisting of pellets, extrudates, spheres, monoliths, and any combinations thereof.

12. The reactor module of claim 10, wherein the catalyst bed contains catalyst selected from the group consisting of autothermal reforming catalysts, partial oxidation catalysts, steam reforming catalysts, water gas shift catalysts, preferential oxidation catalysts, anode tailgas oxidation catalysts, and sulfur absorbents.

13. A method for heating a catalyst bed, comprising:

providing an electrical heating element positioned within a cooling coil located substantially within the catalyst bed; and

heating the electrical heating element thereby heating the catalyst bed to a desired temperature.

14. The method of claim 13, wherein the desired temperature is the start-up temperature.

15. The method of claim 13, wherein the desired temperature is the desired reaction temperature during transient operation.

16. A method for heating a catalyst bed to a desired temperature, comprising:

providing a catalyst bed in communication with an electrical heating element; and

heating the electrical heating element so as to maintain the desired temperature of the catalyst bed.

17. The method of claim 16, wherein the desired temperature is the start-up temperature.

18. The method of claim 16, wherein the desired temperature is the desired reaction temperature during transient operation.

19. The method of claim 16, wherein the electrical heating element is weaved through the catalyst bed.

20. The method of claim 16, wherein the catalyst bed is a monolith.

21. The method of claim 18, wherein the electrical heating element is wrapped around the monolith.

22. A method for heating a catalyst bed to a desired temperature, comprising: positioning an electrical heating element upstream of the catalyst bed; and passing a fluid across the electrical heating element and through the catalyst bed, wherein the catalyst bed is heated to the desired temperature.

23. The method of claim 22, wherein the desired temperature is the start-up temperature.

24. The method of claim 22, wherein the desired temperature is the desired reaction temperature during transient operation.